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A LIST OF THE MACROFAUNA IN THE INTERTIDAL ZONE OF THE KURILE ISLANDS, WITH REMARKS ON ZOOGEO- GRAPHICAL STRUCTURE OF THE REGION

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With Text-figures 1-3

Introduction

The Kurile Islands extending over vast stretches from north to south in the western North Pacific are particularly interesting to hydrobiologists and biogeographers. Here a complex interaction of currents along with the effects of the latitudinal climatic change and a number of other factors are responsible for an extremely complicated biogeographical and hydrobiological picture. On the one hand, the two faunas and floras of different origins meet each other in this region. One of them is relatively warm-water (low-boreal with the admixture of subtropical elements), and reaches the Kuriles from the south along the coast of Japan. The other is relatively cold-water (high-boreal) and arrives here from the north with cold waters of the Bering Sea and the northern part of the Pacific.

On the other hand, due to a complicated hydrological regime, a number of faunistic areas considerably different from one another can be marked within each of the two clearly distinguished biogeographical subdivisions (low- and high-boreal).

On the southern Kurile Islands, including Iturup, the Okhotsk and Pacific coasts of one and the same island significantly differ from each other. Proceeding northwards, this contrast is smoothing out. The local ecological factors and bionomic peculiarities of the areas (for example, bays with muddy sand protected from surf as observed on Shikotan Island and in the south of Kunashir Island are missing on the islands further north) no doubt play an important part in faunistic differentiation in various areas of the Kurile Islands. However, even in bionomically similar places the above faunistic difference is still rather noticeable. Straits can hardly be regarded as actual faunistic barriers since most of them are narrow, the widest being no more than 70 km in width.

The present paper is intended to show the close connection of differences in the faunal composition with the correlation of certain biogeographical components which in turn changes in full accordance with the distribution of summer temperature of the waters skirting the Kurile Islands. During warm seasons the water temperature

of the upper layers in different areas of the archipelago fluctuates so greatly that within a narrow latitudinal range between the warmest Kunashir Island and the coldest middle Kuriles (only 4°) these fluctuations often reach 12–13°C. The above temperature regime is responsible for a considerable difference in the population of these regions.

Short Review of Previous Works

Though faunistic and floristic research of sea coasts of the Kurile Islands was started as early as at the end of the 18th century, it was not until 1933 and 1941 when the Japanese botanists Miyabe and Nagai made the first attempt to characterize this region floristically. They divided the Kurile coasts into three floristic districts: high-boreal, low-boreal and north-temperate.

The extensive faunistic and floristic material collected by Russian hydrobiologists from 1947 to 1968 appeared quite sufficient for a more thorough biogeographical analysis of the area in question. According to Ushakov (1953, 1955), Gurjanova (1955), Kobjakova (1958, 1959) and Scarlato (1956, 1960), the southern Okhotsk continental shelf with the northern Hokkaido coasts, the Aniva Bay and southern Kuriles as far as the Ekaterina Strait is included in the Japan Sea Province of the Far Eastern subregion of the Pacific boreal region. E. Gurjanova distinguishes the Kurile coasts north off the Ekaterina Strait and the bathyal zone east off the Small Kurile Archipelago (Suisio Sioto) as the independent Kurile Province. But all the above authors regarded the fauna and flora of the continental shelf as a whole, and this is the reason why the scheme of biogeographical demarcation proposed by them can only roughly be applied to the intertidal zone of the region in question.

A biogeographical analysis especially of the fauna and partially of the flora of the intertidal zone of the Kuriles was made only by Kussakin (1956), chiefly on the data of isopods and decapods, Khlebovitch (1958, 1961) on the data of polychaets, Golikov and Kussakin (1962) on the data of castropods, and finally by Kussakin (1970) on the data of isopods and gastropods.

According to the common conclusion of these authors, the southern Kurile intertidal zone as far as the Iturup north-west coast, inclusively, with the Hokkaido intertidal zone, northern parts of Honshu, Soviet continental coast (Primorsk) and some parts of South Sakhalin should be included in a south-boreal biogeographical province. V. Khlebovitch names it the Japan Sea Province, and A. Golikov and Kussakin the North-Japan Province. Kussakin (1956) roughly places a southern boundary of this province along a line connecting Wonsan, Noto Peninsula, and Inubo Cape.

The southeast coast of Iturup Island with all the islands situated further north are included by the above authors in an independent biogeographical province. Emphasizing the presence of many endemic species and even the endemic genus among Laminariales, i.e. *Pleuropterum* near the northern and middle Kuriles, Kussakin (1956) considered it possible to treat the Kurile Province as an independent province.

But a biogeographical analysis of polychaets and gastropods had not permitted the subsequent authors to accept this viewpoint; that is why Khlebovitch (1961) included the above North and Middle Kuriles with the Komandor Islands and East Kamchatka in the Kurile-Komandor Province. Golikov and Kussakin (1962) now single out the North Kurile district within the Aleut-Komandor Province (or super-province) which is also supposed to comprise the Pacific coast of Alaska, the Aleutian and Komandor Islands and the Kamchatka Pacific coast as well.

The fact that the Kuriles are the place of distribution of the two overlapping, originally different, warm and cold water faunas can no longer be debated. Neither can be doubted the significant biogeographical boundary near Iturup Island which sharply separates two subdivisions of no lesser range than province. Further more, Golikov and Kussakin (1962), and Kussakin (1970, 1971) with growing certainty presented an opinion that there lay a boundary between two subregions: the Ayne, or the North-Japan low-boreal and the Beringian high-boreal ones. This conclusion is to be illustrated below by greater actual data.

A List of Macrofauna

The present list is based on the samples collected by the expeditions of Leningrad and Far East Universities, Leningrad Zoological Institute and the Institute of Marine Biology in Vladivostok in the Kurile intertidal zone for more than 20 years (Kussakin et al., 1973). The material were treated by experts. A number of specialists from the Institute of Marine Biology and Zoological Institute took part in compiling the cited list. In contrast to the previous lists published in Russian the present one contains a reduced number of faunistic areas. For example, the column of Shikotan Island is added by the few data on other islands of the Small Kurile Archipelago (Suisio Sio) which are poorly investigated. The scattered data from other North Kuriles are included in the column of Paramushir Island. Each species is biogeographically characterized according to the common scheme accepted by most Russian hydrobiologists. The meiofauna data are not included in the present list, since the species of the meiofauna groups cannot yet adequately be characterized biogeographically.

In the column "biogeographical group" there are given the following abbreviations for the types distinguished in the distribution pattern.

1. ab.—Amphiboreal species widely distributed in the Atlantic and Pacific boreal waters.
2. p.wb.—Widely distributed Pacific boreal species inhabiting both Asiatic and American coasts.
3. as.wb.—Widely distributed boreal Asiatic species.
4. p.hb.—Pacific high-boreal species mainly found in the Okhorsk Sea except its southern part, and in the Pacific from the Middle and North Kuriles as far as American coasts. A considerable number of these species penetrate much further south along the American coasts than along the Asiatic ones.
5. as.hb.—Asiatic high-boreal species. A considerable number of these species inhabit other than the Kuriles the Okhotsk Sea, the coasts of East Kamchatka and Bering Sea but is never met with east of the Komandor Islands.
6. b.-a.—Boreo-arctic species.

7. as.lb.—Asiatic low-boreal species mainly distributed around North Japan, in the northern part of the Japan Sea and in the southern part of the Okhotsk Sea.
8. as.st.-lb.—Asiatic subtropical-low-boreal species, more or less widely distributed in the Yellow and Japan Seas, around Japan and reach only the warmest parts of low boreal areas. Here also belong a few Asiatic tropical-low boreal species (as.tr.-lb).
9. p.st.-lb.—Species distributed in subtropical and low boreal waters on either side of the Pacific Ocean.
10. tr.-lb.—Species known for tropical and low-boreal waters and outside the Pacific.
11. ap.—Amphipacific species distributed on low-boreal waters of both Asiatic and American coasts.
12. a.st.b.—Species widely represented both in subtropical and boreal waters of the Asiatic Pacific coasts.
13. p.st.-b.—Species widely distributed in subtropical and boreal waters of both the Atlantic and Pacific.
14. ab.,st.b.—Species of wide distribution in subtropical and boreal waters.
15. bp.—Bipolar species
16. k.—Species of almost world-wide distribution.

The species of the first three groups represent predominantly autochthonous faunistic basis of the three Far Eastern seas of the USSR. The species of the groups from 4 to 6 can be regarded as relatively cold-water, in contrast to relatively warm-water species of the groups from 7 to 11. To the last five groups belong eurythermic species inhabiting too extensive areas to represent peculiarities of certain biogeographical regions.

Biogeographical Composition of the Fauna

Widely Distributed Species

As seen from the list, the principal animal groups of the intertidal zones appear roughly similar in spite of the different hydrological regime of the waters skirting different areas of the Kuriles. Heavy preponderance is shown by the species of the above biogeographical groups from 1 to 3 and to a lesser extent of 12–16 which are widely distributed in all the Far Eastern seas of the USSR.

The most typical and abundant species found in all or almost all the Kurile faunistic areas are such boreal species as *Halichondria panicea*, *Eteone longa*, *Harmothoe imbricata*, *Typosyllis fasciata*, *Exogone gemmifera*, *Autolytus prismaticus*, *Nainereis quadricuspida*, *Paradexiospira vitrea* and *Hiatella arctica*, amphiboreal *Typosyllis armillaris*, *T. variegata*, *Mytilus edulis* and *Turtonia minuta*, almost cosmopolitan *Nereis pelagica* and *Cirratulus cirratus*, as well as bipolar *Boccardia natrix* and *Capitella capitata*. Almost all of them are characteristic of both boreal Atlantic and Pacific. A number of wide-spread species are typical only for the Pacific boreal region, those are *Abietinaria costata*, *Physcosoma japonicum*, *Nereis vexillosa*, *Abarenicola pacifica*, *Chone teres*, *Balanus cariosus*, *Archaeomysis grebnitzkii*, *Anisogammarus pugettensis*, *Gnorimosphaeroma noblei*, *Schizoplax brandti*, *Collisella cassis*, *Littorina kurila* and *Nucella freycinetii*. Several species are widely distributed only along the Asiatic coasts, these are boreal *Telmessus cheiragonus*, *Anisogammarus locustoides*, *A. makarovi*, *A. spasskii*, *Parhyale zibellina*, *Orchestia ochoteniss*, *Caprella cristibrachium*, *Detonella sachalina*, *Falsicingula kurilensis* and *Buccinum percrassum*,

frequently occurring subtropical-boreal *Allorchestes malleolus*, *Talorchestia zachsi* and *Orchestoidea trinitatis*.

A relative percentage of the widely distributed species occurring in the Far-Eastern seas reaches its peak on the coasts of the biogeographically intermediate Iturup Island (54% on the Okhotsk Sea coast and 62.7% on the Pacific coast), its minimum being both in the first, the warmest area, and in the seventh, the coldest

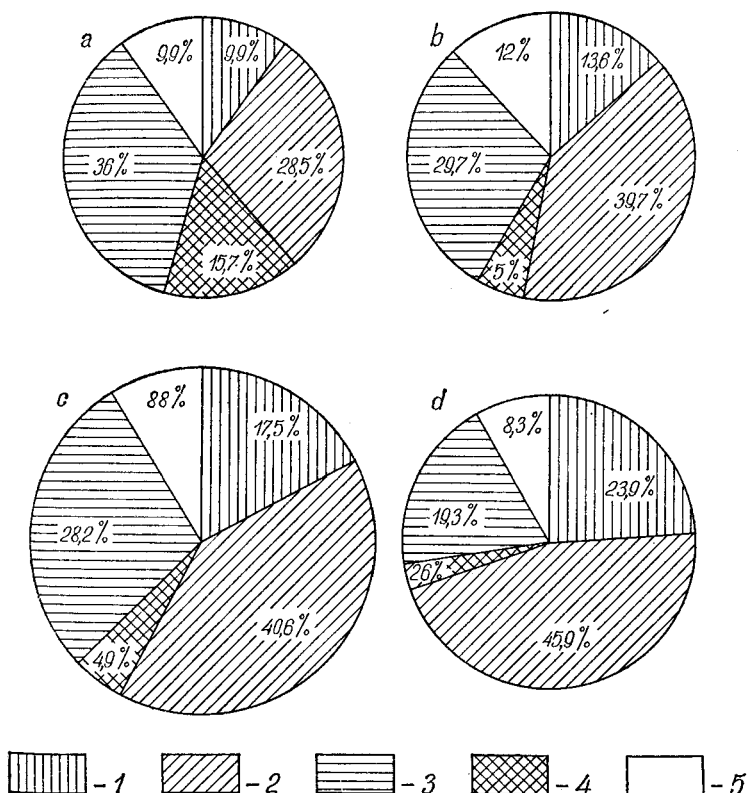


Fig. 1. Biogeographical composition of macrofauna in different low-boreal areas of the Kurile Islands. Areas of the circles in figure are in proportion to a number of species in each faunistic area. a, Okhotsk coast of Kunashir Island, including Izmeny Bay; b, Pacific coast of Kunashir Island; c, Shikotan; d, Okhotsk coast of Iturup Island.

1. Relatively cold-water high-boreal and boreal-arctic species; 2. Widely-distributed boreal species; 3. Low-boreal species; 4. Subtropical and subtropical low-boreal species; 5. Widely-distributed species.

one (38.4% on the west coast of Kunashir Island and 40.2% on Simushir). In the remaining areas their number fluctuates from 49.4% to 51.7% (Figs. 1, 2).

It should be noted that a number of widespread boreal species are missing in the waters of the coldest area near the middle Kuriles. It holds good, for example, for *Collisella* and Paguridae which are so much typical for the intertidal zone of both southern and northern parts of the Kuriles.

Warm Water Species

These species are included in the biogeographical groups from 7 to 9. They are found frequently in the south Kurile waters, and many of them belong to the most numerous dominant forms. They are *Cnidopus japonica*, *Oncoscolex pacificus*, *Bispira polymorpha*, *Dexiospira alveolata*, *Pandalus latirostris*, *P. meridionalis*, *Pagurus brachiomastus*, *Gnorimosphaeroma ovatum*, *Tecticeps glaber*, *Ligia cinerascens*, *Margarites pilsbryi*, *Ephera turrita*, *Littorina mandshurica*, *Tritia fratercula*, *Mitrella burchardi*, *Ocenebra japonica*,

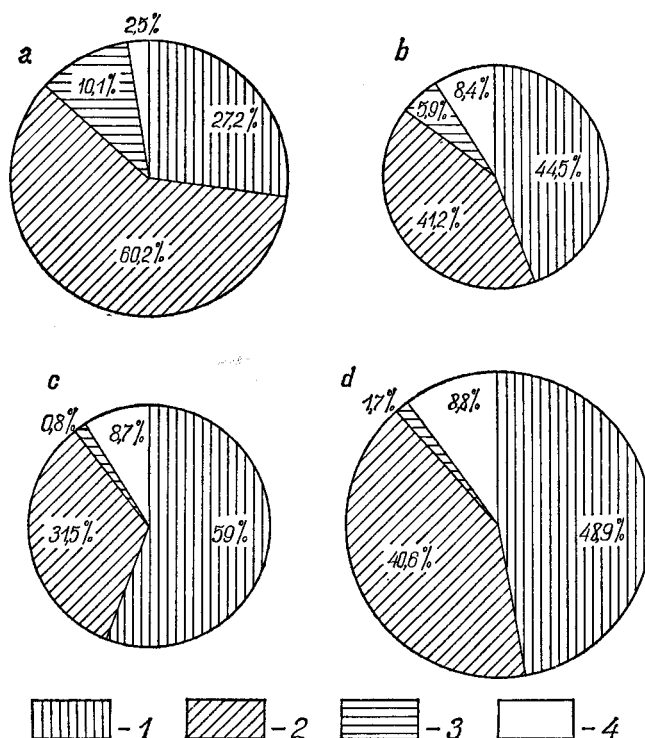


Fig. 2. Biogeographical composition of macrofauna in different high-boreal areas of the Kurile Islands. a, Pacific coast of Iturup Island; b, Urup; c, Simushir; d, Paramushir.

1. High-boreal and boreal-arctic species; 2. Widely-distributed boreal species; 3. Low-boreal species; 4. Widely distributed species.

Boreotrophon candelabrum, *Nucella heyseana*, *Vilasina pillula*, *Peronidia venulosa*, *Mya japonica*, *Protothaca euglypta*, *Venerupis japonica*, *Strongylocentrotus intermedius* and some others. The portion of these warm water species rapidly decreases from 51.7% on the southwestern side of Kunashir Island to 5.9% on Urup Island. Further north only a few species of this group are observable (Fig. 2). The mode of the distribution of the most warm water, subtropic-low-boreal species seems rather specific: a heavy preponderance of these species is found in the south and west coasts of Kunashir Island where some of them are actually numerous (*Hemigrapsus sanguineus*, *Cymodoce acuta*, *Dynoides den-*

tisinus, *Paranthura japonica*, *Tylos granulatus*, *Notoacmea concinna*, *Littorina brevicula*, *Batillaria cumingii*, *Tritia acutidentata*, *Acteocina insignis*, *Musculista senhousia*, *Venerupis japonica* and some others). Here these species occupy 15.7% of the total biota. Further north subtropical species are rapidly reduced in number (Fig. 1); so only 5 of them are known from the Iturup Okhotsk sea side (*Pandalus meridionalis*, *Pugettia quadridens*, *Ligia cinerascens*, *Nuttalia olivacea* and *Patiria pectinifera*). The Pacific side of Iturup Island and other isles north of Iturup lack all the above subtropical elements.

Cold Water Species

A picture of the distribution of relatively cold water, boreal-arctic and high-boreal species represents a striking contrast (Figs. 1, 2). Their portion in the warmest

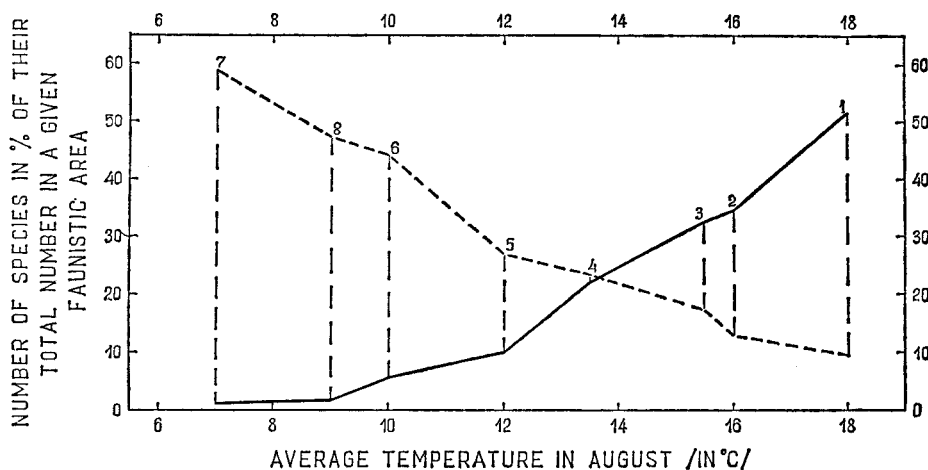


Fig. 3. Warm-water (solid line) and cold-water (broken line) species proportion in different faunistic areas of the Kurile Islands. Ordinate—the number of species, expressed as the percentage of the total number in a given faunistic area. Abscissa—average water temperature in August (in °C).

1. Okhotsk coast of Kunashir Island; 2. Pacific coast of Kunashir Island; 3. Shikotan; 4. Okhotsk coast of Iturup Island; 5. Pacific coast of Iturup Island; 6. Urup; 7. Simushir; 8. Paramushir.

region (Area 1) is less than 10% while in the coldest region (Area 7) it reaches 59%. Only on the coldest middle Kuriles are found such boreal-arctic species as *Brada granulata* and *Crisia eburnea*, high-boreal *Achelia pribilofensis*, *Ptychogonum buticulosum*, *Anatanaia kurilensis*, *Caprogammarus gurjanovae*, *Cercops pectinatus*, *Ianiropsis pallidocula*, *Jaeropsis affinis*, *Munna arnholdi*, *Problacmaea moskalevi*, *Onoba aurivillii* and *Balcis randolphi*.

The above data are considered to be a sufficient support to place a boundary via Iturup Island which divides the Pacific boreal region into two biogeographical subregions: low boreal North-Japan, or Ayne, and high-boreal Beringian. Though the Iturup littoral fauna is transitional, its Okhotsk Sea side is to a greater extent

inclined to the North-Japan, while the Pacific side to the Beringian subregion.

As seen from Fig. 3, considerable regional changes of the littoral fauna within the Kuriles are in good agreement with the temperature distribution of water during warm seasons, for these are the seasons of its widest fluctuations in different areas.

The data on average temperatures of the surface waters given in the Marine Atlas (1953) and in the Sakhaline Region Atlas (1967) were used for the graphic representation in Fig. 3. In late autumn a gradual decreasing of the temperature gradient occurs and by November the surface water temperature falls down to 4°C near Paramushir, and to 8°C near Kunashir. In winter an abrupt water chilling down to 0°C and even lower is observed all over the Kuriles, in southern parts of the region it can be further significant.

It is noteworthy that the curves representing a relative number of warm and cold water species cross over here, and in a transitional area, i.e. the Okhotsk Sea side of Iturup Island it is almost equal (23.9% for cold water and 21.9% for warm water species). The surface water temperature in August here is about 14°C.

The above data support Hutchins' (1947) conclusion that in the regions with strong winter cooling of water (especially below 0°C) summer temperatures are of particular importance for species reproduction and survival. It seems quite natural, since the temperatures for repopulation of various species are more or less constant and are connected with their biogeographical nature (Appelöf, 1912, Orton, 1920, Runnström, 1929, et al.). Most of the isopods and molluscs studied in this respect (Kussakin, 1960, 1962, Golikov and Kussakin, 1962, 1971) have actually definite spawning temperatures. The subtropical species extending their distribution to the warmest regions of the south Kuriles have their reproductive temperatures of no less than 14–18°C. Most of low-boreal species reproduce at temperatures of no less than 10–14°C, widely distributed boreal species at about 2–8°C and high-boreal species at 0–8°C.

Summary

1. The paper presents the data on the distribution of 603 species and subspecies of the littoral macrofauna from 8 faunistic areas of the Kurile Islands.
2. Boreal species widely distributed in Far-eastern seas of the USSR constitute the main basis of all the Kurile fauna.
3. A considerable admixture of warm low-boreal and even subtropical species is observed on the south Kurile Islands as far north as the Ekaterina Strait. It is possible to regard the littoral fauna of these areas as low-boreal and to include it in the North-Japan, or Ayne subregion of the Pacific boreal region.
4. The middle and north Kurile Islands are completely deprived of subtropical elements, and even the low-boreal elements are very few. Their fauna shows an essential admixture of relatively cold water high-boreal species which reach their quantitative peak in the coldest part of the central Kuriles. The fauna of these waters as a whole can be regarded as high-boreal, and included in the Beringian

subregion of the Pacific boreal region.

5. Iturup Island occupies an intermediate position. It has much more high-boreal than low-boreal species on its Pacific side and lacks subtropical ones. The Okhotsk Sea side has roughly equal proportion of warm and cold water species together with a few subtropical.

6. The distribution of cold and warm water species around the Kurile Islands is in full agreement with the temperature distribution of the coastal waters during summer.

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Table 1. List of the intertidal macrofauna of the Kurile Islands.

Species	Biogeographical group	Areas							
		1	2	3	4	5	6	7	8
		Kunashir		Shikotan	Iturup		Urup	Simushir	Paramushir
		Coast of Okhotsk sea (incl. Izmeny Bay)	Coast of Pacific ocean		Coast of Okhotsk sea	Coast of Pacific ocean			
PHYLUM PORIFERA									
Classis Calcispongia									
Ordo Calcarea									
Familia Heteropiidae									
<i>Grantessa nemurensis</i> Hosawa	as.wb.		+	+	+	+		+	+
Classis Demospongia									
Ordo Tetraxonida									
Familia Suberitidae									
<i>Suberites domuncula</i> (Olivi)	b.-a.				+				
Ordo Cornacuspongia									
Familia Mycalidae									
<i>Mycale lobata</i> (Bowerbank)	b.-a.		+	+					
<i>M. adhaerens</i> (Lambe)	p.wb.			+					
Familia Biernidae									
<i>Tylodesma pennata</i> (Lambe)	ap.	+							
Familia Myxillidae									
<i>Myxilla incrustans</i> (Johnston)	b.-a.			+		+			
<i>Lissodendoryx amaknakensis</i> (Lambe)	p.wb.			+	+	+			
Familia Tedaniidae									
<i>Tedania fragilis</i> Lambe	ap.		+			+			
Familia Halichondriidae									
<i>Halichondria panicea</i> (Pallas)	b.-a.	+	+	+	+	+	+	+	+
<i>H. sitiens</i> (O. Schmidt)	b.-a.		+						
Familia Haliclonidae									
<i>Haliclona cinerea</i> Grant	ab.				+				
<i>H. gracilis</i> (Micluch-Maclay)	b.-a.			+	+	+			
PHYLUM COELENTERATA									
Classis Hydrozoa									
Ordo Leptolida									
Familia Bougainvillidae									
<i>Hydractinia echinata</i> (Fleming)	b.-a.			+					
Familia Tubulariidae									
<i>Tubularia larynx</i> Ellis et Solander	ab.		+						
Familia Corynidae									
<i>Coryne pusilla</i> Gaerther	ab.		+	+	+				
<i>Eudendrium annulatum</i> Norman	ab.		+	+	+	+	+		
Familia Campanulariidae									
<i>Campanularia volubilis</i> (L.)	ab.,st.-b.					+			

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
<i>C. platycarpa</i> Bale	p.st.-lb.	+	+	+					
<i>C. integra</i> var. <i>calyculata</i> (Hincks)	k.		+						
<i>Obelia longissima</i> (Pallas)	b.-a.			+	+				
Familia Sertulariidae									
<i>Sertularella mutsuensis</i> Stechow	as.lb.		+						
<i>S. spinosa</i> Kirchenpauer	as.lb.		+						
<i>S. rugosa</i> (L.)	ab.						+		+
<i>Abietinaria costata</i> (Nutting)	p.wb.		+	+	+	+	+		+
<i>A. spiralis</i> Naumov	as.lb.	+							
<i>A. alternithecra</i> (Kudelin)	as.wb.								+
<i>A. abietina</i> (L.)	ab.					+			
<i>A. variabilis</i> (Clark)	p.wb.								+
<i>Abietinaria incostans</i> (Clark)	p.wb.								+
<i>A. filicula</i> (Ell. et Sol.)	ab.,				+	+			+
<i>A. turgida</i> (Clark)	p.wb.								+
Familia Olindiidae									
<i>Gonionemus vertens vertens</i> Agassiz	ap.				+				
Classis Scyphozoa									
Ordo Stauromedusae									
Familia Haliclystidae									
<i>Haliclystus auricula</i> (Rathke)	ab.,st.-b.			+	+	+			+
<i>H. stejnegeri</i> Kishinouye	as.wb.			+	+	+			+
<i>H. borealis</i> Uchida	as.lb.	+	+	+					
<i>Thaumatoscyphus uchidai</i> Naumov	ab.			+					
<i>Th. distinctus</i> Kishinouye	as.hb.							+	+
Classis Anthozoa									
Ordo Actiniaria									
Familia Actiniidae									
<i>Cnidopus japonica</i> (Verrill)	as.lb.	+	+	+					
<i>Anthopleura artemisia</i> (Pickering in Dana)	p.wb.	+	+	+					
<i>A. elegantissima</i> (Brandt)	p.wb.	+	+	+					
<i>A. xanthogrammica</i> (Brandt)	p.wb.	+	+	+					
<i>Tealia coriacea kurila</i> Averincev	as.lb.		+	+					
<i>Charisia saxicola</i> Torrey	p.wb.		+	+					
Familia Metridiidae									
<i>Metridium senile fimbriatum</i> Verrill	ab.	+	+	+					
PHYLUM NEMATHELMINTHES									
Classis Priapulioidea									
Ordo Priapulida									
Familia Priapulidae									
<i>Priapulius caudatus</i> Lamarck	bp.			+					
PHYLUM NEMERTINI									
Classis Anopla									
Ordo Heteronemertini									
Familia Lineidae									
<i>Lineus torquatus</i> Coe	p.wb.		+	+	+				+
<i>Cerebratulus marginatus</i> Renier	ab.,st.-b-			+					
<i>C. communis</i> Takakura	as.hb.								
Classis Enopla									
Ordo Hoplonemertini									
Familia Emplectonematidae									

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Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
<i>Dysponetus pygmaeus</i> Levensen	b.-a.							+	
Familia Glyceridae									
<i>Glycera convoluta</i> Schmarda	p.wb.		+		+				
<i>G. capitata</i> Oersted	b.-a.								
<i>Glycinde armigera</i> Moore	p.wb.	+	+						+
Ordo Nereimorpha									
Familia Syllidae									
<i>Langerhanstia cornuta</i> Rathke	k.	+		+					+
<i>Typosyllis armillaris</i> (Müller)	ab.		+	+	+	+	+	+	+
<i>T. variegata</i> Grube	ab.,st.-b.	+	+	+	+	+	+	+	+
<i>T. uschakovi</i> Chlebovitsch	as.,hb.					+	+	+	
<i>T. fasciata</i> Malmgren	b.-a.		+	+	+	+	+	+	
<i>T. decorus</i> (Annenkova)	as.hb.	+		+	+				
<i>Pterosyllis finmarchica</i> Malmgren	ab.			+					
<i>Pionosyllis compacta</i> Malmgren	b.-a.						+		
<i>Eusyllis blomstrandii</i> Malmgren	b.-a.								+
<i>Sphaerosyllis hirsuta</i> Ehlers	ab.,st.-b.					+			+
<i>S. erinaceus</i> Claparède	b.-a.			+	+				+
<i>Exogone gemmifera</i> Pagenstecher	b.-a.		+	+	+	+		+	+
<i>Autolytus prismaticus</i> (Fabricius)	b.-a.		+	+	+	+	+	+	+
<i>A. beringianus</i> Annenkova	as.hb.		+	+					
<i>A. caterincae</i> Uschakov	as.hb.		+		+	+		+	+
Familia Nereidae									
<i>Lycactopsis augeneri</i> Okuda	as.hb.	+	+	+	+				
<i>Nereis virens</i> Sars	p.wb.	+		+	+				
<i>N. japonica</i> Izuka	ap.	+	+	+	+				
<i>N. vexillosa</i> Grube	p.wb.	+	+	+	+	+	+	+	+
<i>N. pelagica</i> L.	k.	+	+	+	+	+	+	+	+
<i>N. zonata</i> Malmgren	b.-a.	+	+	+	+		+	+	+
<i>Platynereis agassizi</i> (Ehlers)	ap.						+		
Familia Nephthydidae									
<i>Nephthys californiensis</i> Hartman	ap.	+	+			+			
<i>N. coeca</i> (Müller)	b.-a.			+					
Ordo Eunicomorpha									
Familia Eunicidae									
<i>Onuphis iridescens</i> Johnston	bp.		+	+	+				
<i>Lumbriconereis inflata</i> Moore	p.wb.		+	+		+			
<i>L. latreilli</i> Audouin et M.-Edwards	as.wh.		+	+					
<i>Drilonereis filum</i> (Claparède)	ab.,st.-b.		+						
<i>Dorvillea japonica</i> (Annenkova)	ap.	+							
<i>Ophryotrocha puerilis</i> Claparède et Meczников	ab.								+
Ordo Spiomorpha									
Familia Aricidae									
<i>Scoloplos armiger</i> (Müller)	as.wb.	+		+					
<i>Nainereis quadricuspida</i> (Fabricius)	b.-a.	+	+	+	+	+			+
<i>N. laevigata</i> (Grube)	ab.,st.-b.		+	+	+	+			
<i>Sphaerodorum sphaerulifer</i> Moore	p.wb.						+		+
<i>Ephesia gracilis</i> Rathke	b.a.								+
<i>Nerine cirratulus</i> (Delle Chiaje)	ab.		+						
<i>N. alascensis</i> (Treadwell)	p.wb.			+					
<i>N. oligobranchia</i> Chlebovitsch	as.hb.							+	+

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
Familia Spionidae									
<i>Spio filicornis</i> (Müller)	b.-a.		+	+	+	+	+		
<i>S. unidentata</i> Chlebovitsch	as.wb.			+					+
<i>Microspio kussakini</i> Chlebovitsch	as.lb.	+							
<i>Rhynchospio arenicola asiatica</i> Chlebovitsch	as.hb.	+	+	+	+	+			
<i>Pygospio elegans</i> Claparède	ab.			+		+			
<i>Boccardia natrix</i> Söderström	bp.	+	+	+	+	+	+	+	+
<i>B. perata</i> (Chlebovitsch)	as.lb.			+					
<i>Pseudopolydora kemp</i> (Southern)	p.st.-lb.			+					
<i>Polydora ciliata ciliata</i> Johnston	ab.			+					
<i>P. ciliata limicola</i> Annenkova	ab.			+					
<i>P. quadrilobata</i> Jakobi	b.-a.			+					
<i>P. californica</i> Treadwell	b.-a.			+					+
<i>Prionospio cirrifer</i> Wiren	b.-a.								+
Familia Cirratulidae									
<i>Cirriformia tentaculata</i> (Montagu)	ab.,st.-b.		+						
<i>Cirratulus cirratus</i> (Müller)	k.		+	+	+	+	+	+	+
<i>C. branchiocolatus</i> Chlebovitsch	as.lb.	+		+					
<i>Tharyx pacifica</i> Annenkova	as.lb.			+					
<i>Th. epiloca</i> Monro	bp.								+
Ordo Drilomorpha									
Familia Chloramidae									
<i>Flabelligera affinis</i> Sars	bp.			+			+		
<i>Stylarioides plumosa</i> (Müller)	b.-a.	+							
<i>Brada inhabilis</i> (Rathke)	b.-a.			+					
<i>B. granulata</i> Malmgren	b.-a.								
Familia Scalibregmidae									
<i>Scalibregma inflatum</i> Rathke	bp.			+					
<i>Oncoscolex pacificus</i> (Moore)	ap.	+	+	+	+	+			
Familia Opheliidae									
<i>Euzonus arcticus</i> Grube	as.wb.				+				
<i>Armandia brevis</i> (Moore)	ap.			+					
<i>Travisia forbesii</i> Johnston	b.-a.			+					
<i>Ophelia limacina</i> (Rathke)	b.-a.								+
Familia Capitellidae									
<i>Notomastus latericeus</i> Sars	as.wb.			+					
<i>Heteromastus giganteus</i> Zachs	as.hb.			+					
<i>H. filiformis</i> (Claparède)	ab.			+					+
<i>Mediomastus californiensis</i> Hartman	p.wb.	+	+	+	+				
<i>Capitella capitata</i> (Fabricius)	bp.	+	+	+	+	+	+	+	+
<i>Abarenicola pacifica</i> Healy et Wells	p.wb.	+		+	+		+	+	+
<i>A. clapedii oceanica</i> Healy et Wells	p.wb.		+	+		+	+		+
<i>Brachiomaldane vincenti</i> Langerhans	ab.		+	+		+	+		
Familia Maldanidae									
<i>Nicomache personata</i> Johnson	ab.	+	+	+		+	+		
<i>N. minor</i> Arwidsson	b.-a.								+
<i>N. lumbricoides</i> (Fabricius)	bp.								+
<i>Neosabellides litoralis</i> Annenkova	as.hb.						+		+
<i>Isocirrus longiceps</i> (Moore)	ap.			+					+
Familia Sabellariidae									
<i>Idanthyrsus armatus</i> Kinberg	bp.								+

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
Ordo Terebellomorpha									
Familia Ampharetidae									
<i>Schistocomus sovjeticus</i> Annenkova	as.lb.		+						
Familia Terebellidae									
<i>Pista zachsi</i> Annenkova	as.wb.			+					
<i>P. incarriensis</i> Annenkova	as.lb.				+				
<i>P. elongata</i> (Moore)	ap.	+	+						
<i>Nicolea zostericola</i> (Oersted)	b.-a.					+	+		
<i>Polymnia trigonostoma</i> (Schmarda)	ab.,st.-b.	+	+						
<i>Neoamphitrite figulus</i> (Dalyell)	ab.			+					
<i>Terebella ehrenbergi</i> Grube	ab.,st.-b.			+					
<i>T. hesslei</i> Annenkova	ab.			+		+			+
Ordo Serpulimorpha									
<i>Sabella crassicornis</i> Sars	b.-a.							+	+
<i>S. aulacnota</i> Marenzeller	bp.								+
<i>Potamilla neglecta</i> (Sars)	bp.				+	+		+	
<i>P. myriops</i> Marenzeller	as.wb.		+	+		+			
<i>Bispira polymorpha</i> Johnston	ap.		+	+					
<i>B. vancouveri</i> (Kinberg)	ap.			+					
<i>Schizobranhia insignis</i> Bush	p.hb.					+			+
<i>Amphiglena marita</i> Chlebovitsch	p.wb.			+	+	+		+	+
<i>Fabricia sabella</i> (Ehrenberg)	b.-a.			+	+	+		+	+
<i>F. crenicollis</i> Annenkova	as.hb.						+	+	+
<i>Chone teres</i> Bush	p.wb.		+	+	+	+	+	+	+
<i>Ch. infundibuliformis</i> Kroeyer	ab.						+		
<i>Myxicola infundibulum</i> (Montagu)	ab.				+				
Familia Serpulidae									
<i>Serpula vermicularis</i> L.	k.				+				
<i>S. zyphora</i> (Johnson)	p.hb.								+
<i>Hydroides uncinata</i> (Philippi)	tr.-b-		+						
<i>Paradexiospira vitrea</i> (Fabricius)	b.-a-	+		+	+		+	+	+
<i>Dexiospira alveolata</i> (Sachs)	as.lb.	+	+	+					
<i>D. spirilla</i> (L.)	b.-a.	+	+	+	+			+	+
<i>D. semidentata</i> (Bush)	p.wb.								+
<i>Leospira media</i> (Pixell)	ab.			+					
<i>L. granulata</i> (L.)	b.-a.	+		+	+	+	+		
<i>Leodora abnormis</i> (Bush)	p.wb.		+	+	+				
PHYLUM ARTHROPODA									
Classis Pycnogonida									
Ordo Nymphonomorpha									
Familia Nymphonidae									
<i>Nymphon striatum</i> Los.-Los.	as.lb.		+						
Ordo Ascorhynchomorpha									
Familia Ammotheidae									
<i>Achelia gracilipes</i> Cole	p.wb.				+	+			
<i>A. kurilensis</i> Los.-Los.	as.lb.		+						
<i>A. pribilofensis</i> (Cole)	p.hb.							+	
<i>A. alaskensis</i> (Cole)	p.wb.		+						
Ordo Pycnogonomorpha									
Familia Pycnogonidae									
<i>Pycnogonum stearnsi</i> Ives	p.wb.							+	

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
<i>P. buticulosum</i> Hedgpeth	as.hb.								
Classis Crustacea									
Ordo Thoracica									
Familia Lepadidae									
<i>Lepas anatifera</i> L.	k.	+	+	+					
Familia Chthamalidae									
<i>Chthamalus dalli</i> Pilsbry	p.wb.	+	+	+	+	+			
Familia Balanidae									
<i>Balanus cariosus</i> Pallas	p.wb.	+	+	+	+	+	+	+	+
<i>B. rostratus apertus</i> Pilsbry	p.wb.					+			
Ordo Leptostraca									
Familia Nebaliacea									
<i>Nebalia valida</i> Thiele	p.wb.								+
<i>N. japonensis</i> Claus	as.lb.		+	+					
Ordo Decapoda									
Familia Pandalidae									
<i>Pandalus latirostris</i> Rathbun	as.lb.	+	+	+	+				
<i>P. meridionalis</i> (Balls)	as.st.-lb.	+		+	+				
Familia Hyppolytidae									
<i>Spirontocaris brashnikovi</i> Kobjakova	as.wb.				+				
<i>S. ochotensis mororani</i> Rathbun	as.st.-lb.	+		+					
<i>Eualus japonica</i> (Yokoya)	as.lb.	+		+					
<i>Heptacarpus grebnitzkii</i> (Rathbun)	as.lb.			+					
<i>Hetairus brandti</i> Brashnikov	as.wb.				+				
<i>H. fasciata</i> Makarov	as.hb.				+				+
Familia Crangonidae									
<i>Crangon septemspinosa</i> var. <i>propinqua</i> Stimpson	as.st.-lb.	+		+					
Familia Callinassidae									
<i>Upogebia major</i> (de Haan)	as.st.-lb.			+					
Familia Porcellanidae									
<i>Pachycheles stevensii</i> Stimpson	as.st.-lb.		+						
Familia Paguridae									
<i>Pagurus middendorffii</i> Brandt	p.wb.	+	+	+	+	+			+
<i>P. brachiomastus</i> (Thallwitz)	as.lb.	+	+	+	+	+			
<i>P. hirsutiusculus</i> (Dana)	p.wb.			+		+			+
<i>P. undosus</i> (Benedict)	p.hb.								+
Familia Lithodidae									
<i>Hapalogaster grebnitzkii</i> Schallcew	p.wb.			+	+	+			+
<i>Dermaturus mandti</i> Brandt	p.wb.		+	+		+	+		+
<i>Paralithodes brevipes</i> (M.-Edw. et Lucas)	as.wb.		+	+	+	+			+
Familia Majidae									
<i>Pugettia quadridens</i> (de Haan)	as.st.-lb.	+	+	+	+				
Familia Atelecyclidae									
<i>Telmessus cheiragonus</i> (Tilesius)	as.wb.	+	+	+	+	+			+
Familia Cancridae									
<i>Cancer gibbosulus</i> (de Haan)	ap.		+						
Familia Pinnotheridae									
<i>Pinnaxodes major</i> Ortmann	as.st.-lb.		+	+					
Familia Grapsidae									
<i>Hemigrapsus penicillatus</i> (de Haan)	as.st.-lb.		+	+					
<i>Hemigrapsus sanguineus</i> (de Haan)	as.tr.-lb.	+	+						

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
<i>Eriocheir japonicus</i> (de Haan)	as.tr.-lb.	+	+						
Ordo Mysidacea									
Familia Mysidae									
<i>Archaeomysis grebnitzkii</i> Czern.	p.wb.	+	+	+	+	+	+		+
Ordo Cumacea									
Familia Lampropidae									
<i>Lamprops pumilio</i> Zimmer	as.wb.			+					
Familia Diastylidae									
<i>Dimorphostylis asiatica</i> Zimmer	p.st.-lb.			+					
Familia Nannastacidae									
<i>Cumella gurwitchi</i> Lomakina				+					
Ordo Tanaidacea									
Familia Tanaidae									
<i>Tanais alaskensis</i> Richardson	p.hb.				+		+	+	
<i>T. stanfordi</i> Richardson	tr.-b.				+				
<i>Anatanaïs kurilensis</i> Kussakin et Tzareva	as.hb.							+	
Ordo Amphipoda									
Familia Amphithoidae									
<i>Amphithoe annenkovae</i> Gurjanova	as.lb.			+					
<i>A. eoa</i> Bruggen	p.wb.			+	+	+	+	+	+
<i>A. japonica</i> Stebbing	as.lb.	+		+	+				
<i>A. kussakini</i> Gurjanova	as.lb.	+		+	+	+	+		+
<i>A. lindbergi</i> Gurjanova	as.wb.			+	+			+	
<i>A. mea</i> Gurjanova	as.wb.				+				
<i>A. rubricatoides</i> Schoemaker	p.hb.				+		+	+	+
<i>A. simuschirica</i> Kudrjaschov	as.hb.							+	
<i>A. volki</i> Gurjanova	as.lb.				+		+	+	+
<i>A. tarasovi</i> Bulycheva	as.lb.			+					
<i>A. tarasovi sachalinica</i> Gurjanova	as.lb.			+					
Familia Atylidae									
<i>Atylus collingi</i> (Gurjanova)	as.wb.				+	+	+		
<i>A. ekmani</i> (Gurjanova)	as.wb.				+		+		
Familia Calliopiidae									
<i>Calliopijs laeviusculus</i> (Kroeyer)	ab.				+	+	+		+
<i>Halirages bungei</i> Gurjanova	as.hb.								+
<i>Leptamphopus litoralis</i> Gurjanova	as.lb.			+					
Familia Caprogammaridae									
<i>Caprogammarus gurjanovae</i> Kudrjaschov et Vassilenko	as.hb.							+	
Familia Corophiidae									
<i>Corophium uenoi</i> Stephensen	as.lb.			+					
<i>Erichthonius tollii</i> Bruggen	ab.								+
<i>E. comparativus</i> Kudrjaschov	as.hb.					+			
Familia Dexaminidae									
<i>Guernea coalita</i> Norman	as.lb.			+					
<i>G. nordenskjoldi</i> (Hansen)	b.-a.			+					
Familia Dogielinotidae									
<i>Dogielinotus moskvitini</i> (Derzhavin)	as.,st.-b	+	+	+	+				
Familia Gammaridae									
<i>Anisogammarus pugettensis</i> (Dana)	p.wb.	+	+	+	+	+	+		+
<i>A. barbatus</i> Tzvetkova	as.lb.			+	+		+		

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
<i>A. kygi</i> (Derzhavin)	as.wh.	+		+	+		+	+	+
<i>A. locustoides</i> (Brandt)	as.wb.	+	+	+	+	+	+	+	+
<i>A. possjeticus</i> Tzvetkova	as.lb.	+							
<i>A. makarovi</i> (Bulycheva)	as.wb.	+	+	+	+	+	+	+	+
<i>A. ochotensis</i> (Brandt)	as.hb.								+
<i>A. schmidtii</i> (Derzhavin)	as.hb.								+
<i>A. subcarinatus</i> (Bate)	as.hb.								+
<i>A. spasskii</i> (Bulycheva)	as.wb.	+	+	+	+	+	+	+	+
<i>A. tiuschovi</i> (Derzhavin)	as.lb.			+					
<i>Melita dentata</i> (Kroeyer)	b.-a.				+	+			+
<i>M. nigrescens</i> Gurjanova	as.-lb.			+					
<i>Maera dolosa</i> Kudrjaschov	as.hb.								+
Familia Photidae									
<i>Eurytheus sexdentata</i> Stephensen	as.lb.	+							
Familia Haustoriidae									
<i>Eohaustorius washingtonianus</i> (Thorsteinson)	ab.				+	+			
<i>Pontoporeia affinis</i> Lindstrom	b.-a.								+
Familia Phoxocephalidae									
<i>Pontarpinia robusta lindbergi</i> Gurjanova	as.lb.			+		+			
<i>Pararpinia simplex</i> Gurjanova	as.lb.			+					
Familia Isaeidae									
<i>Isaea concinna</i> Gurjanova	as.wb.				+	+			
Familia Ischyroceridae									
<i>Ischyrocerus elongatus</i> Gurjanova	as.wb.			+					
<i>I. anguipes</i> Kroeyer	b.-a.				+	+	+	+	+
<i>I. gurjanovae</i> Kudrjaschov	as.hb.							+	+
<i>I. cristatus</i> Gurjanova	as.wb.				+	+	+		+
<i>I. dezhnevi</i> Gurjanova	as.hb.					+	+		+
<i>I. krascheninnikovi</i> Gurjanova	as.hb.				+	+	+		+
<i>I. serratus</i> Gurjanova	as.wb.				+		+	+	+
<i>I. laetus</i> Gurjanova	as.lb.			+					
<i>Jassa kurilica</i> Kudrjaschov	as.lb.				+				
Familia Lysianassidae									
<i>Anonyx affinis</i> Ohlin	ab.						+		+
<i>A. japonicus</i> Gurjanova	as.wb.			+	+	+			
<i>A. kurilicus</i> Gurjanova	as.hb.								+
<i>A. lilljeborgi</i> Boeck	ab.						+		+
<i>A. nugax pacificus</i> Gurjanova	b.-a.				+				
<i>A. sculptifer</i> Gurjanova	as.-b.								
<i>Anonyx validus</i> Gurjanova	as.wb.						+		
<i>Hippomedon kurilicus</i> Gurjanova	as.hb.			+		+	+		
<i>Lepidoperecreum eoum</i> Gurjanova	as.wb.			+	+				
<i>Orchomenella japonica</i> Gurjanova	as.wb.				+		+		+
<i>O. minuscula</i> Gurjanova	as.lb.						+		+
<i>O. pinguis</i> (Boeck)	b.-a.								+
Familia Oedicerotidae									
<i>Monoculodes castalskii</i> Gurjanova	as.hb.						+		
<i>M. zernovi</i> Gurjanova	as.wb.							+	
Familia Pleustidae									
<i>Neopleustes golikovi</i> Kudrjaschov	as.hb.							+	+
<i>Pleustes behningi</i> (Gurjanova)	as.wb.			+			+		

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
<i>Cymodoce acuta</i> Richardson	ap.st.-lb.	+							
(= <i>C. japonica</i> Richardson)	as.lb.	+	+	+	+				
<i>Gnorimosphaeroma ovatum</i> (Gurjanova)	p.wb.	+	+	+	+	+	+	+	+
<i>G. noblei</i> Menzies	as.lb.	+	+	+					
<i>Holotelson tuberculatus</i> Richardson	as.st.-lb.	+							
<i>Dynoides dentisinus</i> Shen	as.lb.	+	+	+	+	+			
<i>Dynamenella fraudatrix</i> Kussakin	as.lb.	+	+	+		+			
<i>Tecticeps glaber</i> Richardson									
Familia Paranthuridae									
<i>Paranthura japonica</i> Richardson	as.st.-lb.	+							
Familia Idoteidae									
<i>Idotea ochotensis</i> Brandt	as.wb.	+	+	+	+	+			
<i>I. aleutica</i> Gurjanova	p.hb.					+	+	+	+
<i>I. gurjanovae</i> Kussakin	as.wb.		+	+	+	+	+	+	+
<i>Synidotea lata</i> Gurjanova	as.hb.		+		+	+	+	+	+
Familia Arcturidae									
<i>Neastacilla tzvetkowskii</i> Kussakin	as.hb.				+				
<i>N. litoralis</i> Kussakin	as.hb.					+			
<i>N. kurilensis</i> Kussakin	as.hb.					+			
Familia Tylidae									
<i>Tylos granulatus</i> Miers	as.st.-lb.	+							
Familia Ligiidae									
<i>Ligia cinerascens</i> Budde-Lund	tr.-lb.	+	+	+	+				
Familia Scyphacidae									
<i>Detonella sachalina</i> Verhoeff	as.wb.	+		+	+	+	+	+	+
Familia Porcellionidae									
<i>Porcellio scaber</i> Latreille	k.	+	+	+	+	+			
Familia Janiridae									
<i>Ianiropsis kincaidii</i> Richardson	p.wb.	+	+	+	+	+			
<i>I. derjugini</i> Gurjanova	p.wb.		+	+	+	+			
<i>I. setifera</i> Gurjanova	as.wb.		+	+					
<i>I. pallidocula</i> Kussakin	as.hb.							+	
Familia Jaeropsidae									
<i>Jaeropsis affinis</i> Kussakin	as.hb.							+	
Familia Munnidae									
<i>Munna stephenseni</i> Gurjanova	p.wb.			+				+	+
<i>M. chromatocéphala orientalis</i> Kussakin	p.wb.								+
<i>M. setosa</i> Kussakin	as.hb.					+		+	+
<i>M. arnholdi</i> Gurjanova	as.hb.							+	
<i>M. kurilensis</i> Kussakin	as.hb.							+	
PHYLUM MOLLUSCA									
Classis Loricata									
Ordo Lepidopleurida									
Familia Lepidopleuridae									
<i>Lepidopleurus cancellatus</i> Sowerby	ab.								+
<i>L. japonicus</i> Thiele	as.st.-b.					+			
Ordo Chitonida									
Familia Lepidochitonidae									
<i>Tonicella submarmorea</i> (Mff.)	p.wb.		+	+	+	+			+
<i>T. beringensis</i> Jakovleva	as.wb.			+	+				
<i>T. zotini</i> Jakovleva	as.lb.		+	+					

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
<i>T. granulata</i> Jakovleva	as.wb.		+	+	+	+			
<i>Lepidochiton aleuticus</i> (Dall)	p.hb.					+			+
Familia Schizoplacidae									
<i>Schizoplax brandti</i> (Mff.)	p.wb.	+	+	+	+	+	+	+	+
Familia Mopalidae									
<i>Mopalia schrenckii</i> Thiele	as.wb.		+	+					
<i>M. seta</i> Jakovleva	as.lb.		+						
<i>Placiphorella borealis</i> Pilsbry	as.wh.			+		+			+
Familia Cryptoplacidae									
<i>Cryptochiton stelleri</i> (Mff.)	p.wb.		+	+	+	+			+
Familia Ischnochitonidae									
<i>Ischnochiton hakodadensis</i> (Pilsbry)	as.lb.		+	+					
<i>Lophyrochiton albus</i> (L.)	ab.st.-b.								+
<i>Lepidozona albrechti</i> (Schrenck)	as.wb.			+		+			
Classis Gastropoda									
Ordo Docoglossa									
Familia Tecturidae									
<i>Acmaea pallida</i> (Gould)	as.lb.		+	+					
<i>Problacmaea sybaritica</i> (Dall)	p.wb.		+	+	+				+
<i>P. moskalevi</i> Golikov et Kussakin	as.hb.							+	
<i>Rhodopetala rosea</i> Dall	p.hb.								+
<i>Collisella cassis</i> (Eschscholtz)	p.wb.	+	+	+	+	+			+
<i>C. radiata</i> (Eschscholtz)	p.wb.	+	+	+	+	+			+
<i>C. patina</i> (Eschscholtz)	p.wb.	+		+	+	+			+
<i>C. heroldi</i> (Dunker)	as.st.-lb.	+							
<i>Testudinalia scutum</i> (Eschscholtz)				+	+	+			+
<i>Notoacmea concinna</i> (Lischke)	as.st.-lb.	+							
<i>N. schrenckii</i> (Lischke)	as.st.-lb.	+							
Ordo Anisobranchia									
Familia Trochidae									
<i>Margarites helicina</i> (Phipps)	ab.			+	+	+	+	+	+
<i>M. albolineatus</i> (Smith)	p.hb.						+	+	
<i>M. pilsbryi</i> Kuroda et Habe	as.lb.	+	+	+	+	+			
<i>Minolia iridescens</i> (Schrenck)	as.lb.	+							
Familia Turbinidae									
<i>Homalopoma sangarensense</i> (Schrenck)	as.lb.	+							
Ordo Discopoda									
Familia Lacunidae									
<i>Lacuna reflexa</i> (Dall)	p.hb.			+		+		+	+
<i>L. minor</i> (Dall)	p.hb.		+	+	+	+			+
<i>L. uchidai</i> (Habe)	as.lb.		+	+					
<i>Ephera porrecta</i> (Carpenter)	p.hb.								+
<i>E. divaricata</i> (Fabricius)	ab.				+	+			+
<i>E. turrita</i> (A. Adams)	as.lb.	+	+	+					
<i>E. decorata</i> (A. Adams)	as.lb.			+					
Familia Littorinidae									
<i>Littorina kurila</i> Mff.	p.wb.	+	+	+	+	+	+	+	+
<i>L. mandshurica</i> Schrenck	as.lb.	+	+	+	+	+			
<i>L. brevicula</i> Philippi	as.st.-lb.	+							
<i>L. sitchana</i> Philippi	p.hb.			+		+	+	+	+
<i>L. squalida</i> Broderip et Sowerby	p.wb.	+	+	+	+				

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Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
Familia Nassariidae									
<i>Tritia fratercula</i> (Dunker)	as.st.-lb.	+	+	+					
<i>T. acutidentata</i> (Smith)	as.st.-lb.	+							
Familia Buccinidae									
<i>Neptunea arthritica</i> (Bernardi)	as.lb.	+		+					
<i>N. bulbacea</i> (Bernardi)	as.lb.		+						
<i>Volutharpa ampullacea</i> (Mff.)	p.wb.			+				+	+
<i>Buccinum baeri</i> (Mff.)	p.hb.			+		+	+	+	+
<i>B. percrassum</i> Dall	as.wb.		+	+	+	+	+	+	+
<i>B. mirandum</i> Smith	as.lb.		+	+					
<i>B. middendorffii</i> Verkrusen	as.lb.	+							
Familia Pyrenidae									
<i>Mitrella burchardi</i> (Dunker)	as.lb.	+	+	+	+				
<i>M. kobai</i> Golikov et Kussakin	as.hb.							+	+
Familia Muricidae									
<i>Ocenebra japonica</i> (Dunker)	as.lb.	+	+	+	+				
<i>Boreotrophon candelabrum</i> (A. Adams et Reeve)	as.lb.	+		+					
<i>Nucella lima</i> (Martyn)	p.hb.		+	+	+	+	+	+	+
<i>N. freycinetii</i> (Deshayes)	p.wb.	+	+	+	+	+	+	+	+
<i>N. heyseana</i> (Dunker)	as.lb.	+	+	+	+	+			
<i>N. elongata</i> Golikov et Kussakin	as.lb.	+		+					
Ordo Toxoglossa									
Familia Turridae									
<i>Obestoma uchidai</i> Habe	as.lb.			+					
Ordo Homoeostrophia									
Familia Melanellidae									
<i>Balcis randolphi</i> (Vanatta)	p.hb.							+	
Ordo Heterostrophia									
Familia Pyramidellidae									
<i>Odostomia (Odostomia) fujitani</i> Yokoyama	as.lb.			+					
<i>O. (Evalea) culta</i> Dall et Bartsch	as.lb.			+					
<i>O. (Evalea) sitkaensis</i> Clessin	p.hb.							+	+
<i>Menestho exarata</i> (A. Adams)	as.lb.			+					
<i>Pyrrolampyris rufofasciata</i> (Smith)	as.lb.	+							
<i>Iolaea dubia</i> Golikov et Kussakin	as.lb.	+							
Ordo Cephalaspidea									
Familia Scaphandridae									
<i>Acteocina (Decorifer) insignis</i> (Pilsbry)	as.st.-lb.	+							
Ordo Sacoglossa									
Familia Stiligeridae									
<i>Stiliger akkeshiensis</i> Baba	as.lb.				+				
Order Basommatophora									
Familia Siphonariidae									
<i>Siphonacmea oblongata</i> (Yokoyama)	as.lb.	+							
Classis Bivalvia									
Ordo Cyrtodontida									
Familia Mytilidae									
<i>Vilasina pillula</i> Bartsch	as.lb.	+							
<i>V. vernicosa</i> (Mff.)	p.wb.						+	+	+
<i>Modiolus phenax</i> (Dall)	p.hb.						+	+	+
<i>M. litoralis</i> Scarlato et Ivanova	as.hb.							+	+

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
<i>Musculus laevigatus</i> (Gray)	b.-a.	+		+	+				
<i>M. filatovae</i> Scarlato	as.hb.							+	+
<i>M. minutus</i> Scarlato	as.hb.							+	+
<i>Musculista senhousia</i> (Bensen)	as.st.-lb.	+							
<i>Mytilus edulis</i> L.	ab.	+		+	+	+		+	+
Familia Glycymeridae									
<i>Glycymeris yessoensis</i> (Sowerby)	as.lb.	+	+						
Familia Ostreidae									
<i>Crassostrea gigas</i> (Thunberg)	as.st.-lb.		+						
Ordo Pectinida									
Familia Anomiidae									
<i>Pododesmus macrochismus</i> (Deshayes)	p.wb.			+					
Familia Pectinidae									
<i>Mizuchopecten yessoensis</i> (Jay)	as.lb.	+	+						
Order Pholadomyida									
Familia Lyonsiidae									
<i>Entodesma naviculoides</i> Yokoyama	as.lb.		+						
Order Astartida									
Familia Hiatellidae									
<i>Hiatella arctica</i> (L.)	b.-a.	+	+	+	+	+	+	+	+
<i>Panope japonica</i> A. Adams	as.lb.	+		+	+				
Familia Kelliidae									
<i>Mysella kurilensis litoralis</i> Scarlato et Ivanova	as.wb.			+		+			+
<i>M. planata</i> (Dall in Krause)	b.-a.								
<i>M. gurjanovae elongata</i> Scarlato et Ivanova	as.hb.					+			+
Ordo Venerida									
Familia Veneridae									
<i>Callista brevisiphonata</i> (Carpenter)	as.lb.			+					
<i>Protothaca euglypta</i> (Sowerby)	as.lb.	+	+	+	+	+			
<i>Venerupis japonica</i> (Deshayes)	as.st.-lb.	+	+	+					
Familia Turtoniidae									
<i>Turtonia minuta</i> (Fabricius)	ab.		+	+	+	+	+	+	+
Familia Cardiidae									
<i>Clinocardium californiense</i> (Deshayes)	p.wb.		+	+					
<i>C. uchidai</i> Habe	p.wb.								+
Familia Mactridae									
<i>Spisula sachalinensis</i> (Schrenck)	as.lb.		+						
Familia Tellinidae									
<i>Gadella lubrica</i> (Gould)	as.lb.		+						
<i>Macoma calcarea</i> (Gmelin)	b.-a.								
<i>M. incongrua</i> (Martens)	as.st.-lb.	+		+					
<i>Peronidia lutea</i> (Gray)	p.wb.	+	+	+		+			
<i>P. venulosa</i> (Schrenck)	as.lb.	+	+	+					
Familia Psammobiidae									
<i>Nuttallia olivacea</i> (Jay)	as.st.-lb.				+				
<i>N. ezonis</i> Habe et Kuroda	as.lb.	+			+				
Familia Solenidae									
<i>Siliqua alta</i> (Broderip et Sowerby)	p.wb.	+	+						
<i>Abra pacifica</i> Scarlato et Ivanova	as.hb.					+			+
Familia Myidae									
<i>Mya japonica</i> Jay	as.st.-lb.	+		+					

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
<i>M. priapus</i> Tilesius	p.hb.								+
Familia Pholadidae									
<i>Penitella penita</i> (Conrad)	ap.		+						
Familia Teredinidae									
<i>Teredo navalis</i> L.	ab.,st.-lb.	+							
<i>Bankia setacea</i> (Tryon)	ap.			+	+	+			
PHYLUM PODAXONIA									
Classis Bryozoa									
Ordo Cyclostomata									
Familia Crisiidae									
<i>Crisia eburnea</i> (L.)	b.-a.							+	
Ordo Ctenostomata									
Familia Alcyonidiidae									
<i>Alcyonidium albidum</i> Alder	b.-a.			+					
<i>A. irregulare</i> Kluge	b.-a.						+		
<i>A. mamillatum</i> Alder	b.-a.	+							
<i>A. mytili</i> Dalyell	b.-a.		+	+		+			
<i>A. gelatinosum</i> var. <i>diaphanum</i> (Farre)	b.-a.								
Familia Flustrellidae									
<i>Flustrella corniculata</i> (Smitt)	b.-a.		+	+		+		+	+
<i>F. hispida</i> (Fabricius)	b.-a.			+					
<i>F. gigantea</i> Silen	b.-a.								+
<i>F. cervicornis</i> Robertson	p.hb.		+						
<i>F. vegae</i> Silen	as.hb.								+
Ordo Cheilostomata									
Familia Membraniporidae									
<i>Cauloramphus spiniferum</i> Johnston	ab.	+	+	+					
Familia Scrupocellariidae									
<i>Tricellaria ternata</i> (Ellis et Solander)	b.-a.		+						
Familia Smittinidae									
<i>Smittina minuscula</i> (Smith)	b.-a.		+						
Familia Hippothoidae									
<i>Hippothoa hyalina</i> L.	k.	+	+	+	+	+			
Familia Microporellidae									
<i>Microporella ciliata</i> (Pallas)	ab.			+					
<i>M. mallusii</i> Audouin	ab.,st.-b.	+							
Familia Celleporidae									
<i>Cellepora nordenskjoeldii</i> Kluge	b.-a.	+	+						
<i>C. circularis</i> (Packard)	b.-a.								+
PHYLUM BRACHIOPODA									
Classis Brachiopoda									
Ordo Terebratulida									
Familia Dallinidae									
<i>Diestothyris frontalis</i> Mff.	p.wb.							+	+
PHYLUM ECHINODERMATA									
Classis Holothurioidea									
Ordo Dendrochirota									
Familia Cucumariidae									
<i>Cucumaria vegae</i> Theel	as.wb.			+	+	+	+	+	+
<i>C. sachalinica</i> Theel	as.wb.			+				+	
<i>C. pusilla</i> Ludwig	p.hb.								+

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
<i>C. fraudatrix</i> Djakonov et Baranova	as.lb.	+	+	+	+				
Classis Asteroidea									
Ordo Spinulosa									
Familia Asterinidae									
<i>Patiria pectinifera</i> (Müller et Troschel)	as.st.-lb.	+		+					
Familia Echinasteridae									
<i>Henricia tumida</i> Verrill	p.wb.	+		+	+	+		+	+
Ordo Forcipulata									
Familia Asteriidae									
<i>Lysastrosoma anthosticta</i> Fischer	as.lb.	+							
<i>Distolasterias elegans</i> Djakonov	as.lb.	+							
<i>Lethasterias fusca</i> Djakonov	as.lb.	+							
<i>L. nanimensis</i> f. <i>chelifera</i> Djakonov	p.wb.	+							
<i>Aphelasterias japonica</i> Bell	as.lb.	+							
<i>Evasterias retifera</i> f. <i>tabulata</i> Djakonov	p.wb.	+		+	+				
<i>Asterias amurensis</i> Lüthken	as.lb.	+	+						
<i>Leptasterias similispinis</i> (Clark)	as.lb.		+		+				
<i>L. kussakini</i> Baranova	as.lb.				+	+			
<i>L. alaskensis asiatica</i> Fischer	p.hb.							+	+
<i>L. camtschatica</i> (Brandt)	as.hb.						+	+	+
<i>L. derbecki</i> Djakonov	p.wb.								+
Classis Echinoidea									
Ordo Camarodonta									
Familia Strongylocentrotidae									
<i>Strongylocentrotus intermedius</i> Agassiz	as.lb.	+	+	+	+	+			
<i>S. polyacanthus</i> Agassiz et Clark	as.hb.			+	+	+	+	+	+
<i>S. droebachiensis</i> Müller	b.-a.						+	+	+
Ordo Clypeasteroidea									
Familia Scutellidae									
<i>Echinarachnius parma</i> (Lamarck)	ab.			+					
<i>Scaphechinus griseus</i> (Mortensen)	as.lb.			+					
Classis Ophiuroidea									
Ordo Ophiurae									
Familia Ophiactidae									
<i>Ophiopholis aculeata</i> (L.)	ab.	+	+	+	+	+		+	+
PHYLUM TUNICATA									
Classis Ascidiacea									
Ordo Pleurogona									
Familia Styelidae									
<i>Dendrodoa aggregata</i> (Rathke)	b.-a.								+
<i>Styela clavata</i> (Pallas)	p.hb.						+	+	
<i>S. coreacea litoralis</i> Beniaminsson	as.hb.						+	+	
Familia Pyuridae									
<i>Boltenia echinata</i> (L.)	ab.								
Ordo Enterogona									
Familia Polyclinidae									
<i>Amaroucium oculatum</i> Beniaminsson	as.hb.								+
<i>A. vinogradovae</i> Beniaminsson	as.lb.			+					
<i>A. kurilense</i> Beniaminsson	as.hb.					+			
<i>A. tenuicaudum</i> Beniaminsson	as.lb.			+					
<i>Ritterella iturupica</i> Beniaminsson	as.hb.					+			

Species	Biogeogr. gr.	1	2	3	4	5	6	7	8
<i>R. gurjanovae</i> Beniaminson	as.hb.					+			
PHYLUM CHORDATA									
Classis Pisces									
Ordo Perciformes									
Familia Stichacidae									
<i>Stichaeopsis nana</i> Kner et Steindacher	as.lb.		+	+	+				
<i>S. epallax</i> (Jordan et Snyder)	as.lb.				+				
<i>Alectrias alectrolophus alectrolophus</i> (Pallas)	p.wb.			+	+				+
Familia Pholidae									
<i>Pholis dolichogaster</i> (Pallas)	p.wb.		+						+
<i>Ph. pictus</i> (Kner)	as.wb.		+						+
<i>Ph. nebulosus</i> (Schlegel)	lb.		+						
<i>Opisthocentrus dybowskii</i> (Steindacher)	as.wb.		+						
Familia Zoarcidae									
<i>Zoarces viviparus elongatus</i> (Kner)	as.wb.		+						
<i>Hadropareia semisquamata</i> Andriashev	as.lb.			+	+				
Familia Hexagrammidae									
<i>Hexagrammos lagocephalus</i> (Pallas)	p.wb.								+
<i>H. octogrammus</i> (Pallas)	p.wb.		+						
Familia Cottidae									
<i>Myoxocephalus stelleri</i> Tilesius	as.wb.	+	+	+					+
<i>M. niger</i> (Bean)	p.hb.								+
<i>Porocottus allisi</i> (Jordan et Starks)	as.lb.	+		+					
<i>P. tentaculatus</i> (Kner)	as.lb.			+	+				
<i>P. bladfordi albomaculatus</i> (Schmidt)	p.hb.							+	
<i>P. camtschaticus</i> (Schmidt)	as.hb.			+				+	+
<i>Gymnacanthus pistilliger</i> (Pallas)	p.wb.					+			
<i>Blepsias cirrhosus</i> (Pallas)	p.wb.		+						
Familia Scorpaenidae									
<i>Sebastes schlegeli</i> Hilgendorf	p.lb.		+						